No. 2
Nov. 30, 1955

T R O P I C A L H O U S I N G & P L A N N I N G

M O N T H L Y B U L L E T I N

for Dr. C. A. Doxiadis*

I. Current Literature

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*This report has been compiled for private circulation only by Prof. J. Tyrwhitt, 77 Trowbridge Street, Cambridge, Mass., U.S.A.

GENERAL

1. Shuman, Laurence. Architectural record time-saver standards: Thermal insulation -- 12U and 13U: Factors for flat roofs, and Factors for pitched roofs. (In Architectural record, Oct. 1955, vol. 118:4, p. 253, 255; tables.)

   Photostatic copy of plates herewith.

ARCHITECTURAL RECORD, Oct. 1956, vol. 118:4, p. 255

TIME-SAVER STANDARDS

AE

THERMAL INSULATION—12: U Factors for Flat Roofs

By Laurence Shuman, Consulting Engineer

Legend:

Insulation on Roof Deck

- A None
- B ½" insulation board
- C 1" insulation board
- D 1½" insulation board
- E 2" insulation board
- F 1" corkboard
- G 1½" corkboard
- H 2" corkboard

Ceiling Finishes

- 7 1 sheet aluminum under air space at least 7½", no ceiling
- 8 Aluminum foil back-up on lath, plaster ceiling
- 9 2 sheets aluminum foil, two air spaces, no ceiling
- 10 Aluminum foil back-up on lath and 1 sheet foil, two air spaces, plastered
- 11 3 sheets aluminum foil, three air spaces, no ceiling
- 12 Aluminum foil back-up on lath, 2 sheets foil, three air spaces, plastered

ROOFING
INSULATION
CEILING

Roof Deck	Ceiling Finish	Season	Insulation on Roof Deck A	B	C	D	E	F	G	H
Metal roof deck	7	Winter	.30	.21	.16	.13	.11	.15	.12	.10
		Summer	.10	.08	.07	.07	.06	.07	.06	.06
	8	Winter	.30	.20	.16	.13	.11	.15	.12	.10
		Summer	.11	.09	.08	.07	.07	.08	.07	.06
	9	Winter	.19	.15	.12	.10	.09	.12	.10	.08
MET. DECK		Summer	.07	.07	.06	.05	.05	.06	.05	.05
	10	Winter	.19	.15	.12	.10	.09	.12	.10	.08
		Summer	.08	.07	.06	.06	.05	.06	.06	.05
	11	Winter	.14	.11	.10	.08	.07	.09	.08	.07
MET. DECK		Summer	.06	.05	.05	.05	.04	.05	.04	.04
	12	Winter	.13	.11	.10	.08	.07	.09	.08	.07
		Summer	.06	.06	.05	.05	.04	.05	.05	.04
Concrete roof deck 2" thick	7	Winter	.29	.20	.15	.14	.11	.14	.12	.10
		Summer	.10	.08	.07	.07	.06	.07	.06	.06
	8	Winter	.28	.20	.15	.14	.11	.14	.12	.10
		Summer	.11	.09	.08	.07	.06	.08	.07	.06
	9	Winter	.19	.14	.12	.10	.09	.11	.09	.08
CONCRETE		Summer	.07	.06	.06	.05	.05	.06	.05	.05
	10	Winter	.18	.14	.12	.10	.09	.11	.09	.08
		Summer	.08	.07	.06	.06	.05	.06	.06	.05
	11	Winter	.13	.11	.09	.08	.07	.09	.08	.07
CONCRETE		Summer	.06	.05	.05	.05	.04	.05	.04	.04
	12	Winter	.13	.11	.09	.08	.07	.09	.08	.07
		Summer	.06	.06	.05	.05	.04	.05	.05	.04
Concrete roof deck 4" thick	7	Winter	.27	.19	.15	.14	.10	.14	.11	.10
		Summer	.10	.08	.07	.07	.06	.07	.06	.06
	8	Winter	.27	.19	.15	.14	.10	.14	.11	.10
		Summer	.11	.09	.08	.07	.06	.08	.07	.06
	9	Winter	.18	.14	.12	.10	.08	.11	.09	.08
CONCRETE		Summer	.07	.06	.06	.05	.05	.06	.05	.05
	10	Winter	.18	.14	.11	.10	.08	.11	.09	.08
		Summer	.08	.07	.06	.06	.05	.06	.06	.05
	11	Winter	.13	.11	.09	.08	.07	.09	.08	.07
CONCRETE		Summer	.06	.05	.05	.04	.04	.05	.04	.04
	12	Winter	.13	.11	.09	.08	.07	.09	.08	.07
		Summer	.06	.06	.05	.05	.04	.05	.05	.04
Concrete roof deck 6" thick	7	Winter	.26	.19	.15	.13	.10	.14	.11	.09
		Summer	.09	.08	.07	.06	.06	.07	.06	.06
	8	Winter	.26	.19	.14	.12	.10	.14	.11	.09
		Summer	.10	.09	.08	.07	.06	.08	.07	.06
	9	Winter	.17	.14	.11	.10	.08	.11	.09	.08
CONCRETE		Summer	.07	.06	.06	.05	.05	.06	.05	.05
	10	Winter	.17	.14	.11	.10	.08	.11	.09	.08
		Summer	.08	.07	.06	.06	.05	.06	.05	.05
	11	Winter	.13	.10	.09	.08	.07	.09	.08	.07
CONCRETE		Summer	.06	.05	.05	.04	.04	.05	.04	.04
	12	Winter	.13	.10	.09	.08	.07	.09	.08	.07
		Summer	.06	.05	.05	.05	.04	.05	.05	.04

Roof Deck	Ceiling Finish	Season	Insulation on Roof Deck A	B	C	D	E	F	G	H
Wood roof deck 1" thick	7	Winter	.22	.17	.13	.11	.10	.13	.11	.09
		Summer	.09	.08	.07	.07	.06	.07	.06	.06
	8	Winter	.22	.17	.13	.11	.10	.13	.11	.09
		Summer	.10	.09	.08	.07	.06	.07	.07	.06
	9	Winter	.16	.13	.11	.09	.08	.10	.09	.08
WOOD		Summer	.07	.06	.06	.05	.05	.05	.05	.05
	10	Winter	.16	.13	.11	.09	.08	.10	.09	.08
		Summer	.07	.07	.06	.05	.05	.06	.05	.05
	11	Winter	.12	.10	.09	.08	.07	.08	.07	.06
WOOD		Summer	.05	.05	.05	.04	.04	.05	.04	.04
	12	Winter	.12	.10	.09	.08	.07	.08	.07	.06
		Summer	.06	.05	.05	.04	.04	.05	.04	.04
Wood roof deck 1½" thick	7	Winter	.21	.16	.13	.11	.09	.12	.10	.09
		Summer	.09	.08	.07	.07	.06	.07	.06	.05
	8	Winter	.21	.16	.13	.11	.09	.12	.10	.09
		Summer	.09	.08	.07	.07	.06	.07	.06	.06
	9	Winter	.15	.12	.10	.09	.08	.10	.08	.07
WOOD		Summer	.07	.06	.05	.05	.05	.05	.05	.05
	10	Winter	.15	.12	.10	.09	.08	.10	.08	.07
		Summer	.07	.06	.06	.05	.05	.06	.05	.05
	11	Winter	.11	.10	.08	.07	.07	.08	.07	.06
WOOD		Summer	.05	.05	.04	.04	.04	.04	.04	.04
	12	Winter	.11	.10	.08	.07	.07	.08	.07	.06
		Summer	.06	.05	.05	.04	.04	.05	.04	.04
Wood roof deck 2" thick	7	Winter	.19	.15	.12	.10	.09	.11	.10	.08
		Summer	.08	.07	.06	.06	.05	.06	.06	.05
	8	Winter	.18	.15	.12	.10	.09	.11	.10	.08
		Summer	.09	.08	.07	.06	.06	.07	.06	.06
	9	Winter	.14	.11	.09	.08	.07	.09	.08	.07
WOOD		Summer	.07	.06	.05	.05	.05	.05	.05	.04
	10	Winter	.14	.11	.09	.08	.07	.09	.08	.07
		Summer	.07	.06	.06	.05	.05	.06	.05	.05
	11	Winter	.10	.09	.08	.07	.06	.08	.07	.06
WOOD		Summer	.05	.05	.04	.04	.04	.04	.04	.04
	12	Winter	.10	.09	.08	.07	.06	.08	.07	.06
		Summer	.06	.05	.05	.04	.04	.05	.04	.04
Wood roof deck 3" thick	7	Winter	.15	.12	.11	.09	.08	.10	.09	.08
		Summer	.07	.07	.06	.06	.05	.06	.05	.05
	8	Winter	.15	.12	.11	.09	.08	.10	.09	.08
		Summer	.08	.07	.06	.06	.05	.06	.06	.05
	9	Winter	.12	.10	.09	.08	.07	.08	.07	.06
WOOD		Summer	.06	.05	.05	.05	.04	.05	.05	.04
	10	Winter	.12	.10	.09	.08	.07	.08	.07	.06
		Summer	.06	.06	.05	.05	.05	.05	.05	.04
	11	Winter	.09	.08	.07	.06	.06	.07	.06	.06
WOOD		Summer	.05	.04	.04	.04	.04	.04	.04	.04
	12	Winter	.09	.08	.07	.06	.06	.07	.06	.06
		Summer	.05	.05	.04	.04	.04	.04	.04	.04

ARCHITECTURAL RECORD Oct. 1955, vol. 118:4, p. 257

TIME-SAVER STANDARDS

AE

THERMAL INSULATION—13: U Factors

By Laurence Shuman, Consulting Engineer

U Factors for Flat Roofs

Legend:

Insulation on Roof Deck

- **A** None
- **B** ½" insulation board
- **C** 1" insulation board
- **D** 1½" insulation board
- **E** 2" insulation board
- **F** 1" corkboard
- **G** 1½" corkboard
- **H** 2" corkboard

Ceiling Finishes

- **7** 1 sheet aluminum under air space at least 7½", no ceiling
- **8** Aluminum foil back-up on lath, plaster ceiling
- **9** 2 sheets aluminum foil, two air spaces, no ceiling
- **10** Aluminum foil back-up on lath and 1 sheet foil, two air spaces, plastered
- **11** 3 sheets aluminum foil, three air spaces, no ceiling
- **12** Aluminum foil back-up on lath, 2 sheets foil, three air spaces, plastered

ROOFING
INSULATION
CEILING

Roof Deck	Ceiling Finish	Season	Insulation on Roof Deck A	B	C	D	E	F	G	H
Gypsum fiber concrete roof deck 2½" thick	7	Winter	.20	.15	.12	.10	.09	.12	.10	.08
		Summer	.08	.07	.07	.06	.06	.06	.06	.05
	8	Winter	.20	.15	.12	.10	.09	.12	.10	.08
		Summer	.09	.08	.07	.06	.06	.07	.06	.06
GYPSUM / GYPSUM B'D	9	Winter	.14	.12	.10	.09	.08	.10	.08	.07
		Summer	.06	.06	.05	.05	.05	.05	.05	.04
	10	Winter	.14	.12	.10	.09	.08	.09	.08	.07
		Summer	.07	.06	.06	.05	.05	.06	.05	.05
GYPSUM / GYPSUM B'D	11	Winter	.11	.10	.08	.07	.06	.08	.07	.06
		Summer	.05	.05	.04	.04	.04	.04	.04	.04
	12	Winter	.11	.10	.08	.07	.06	.08	.07	.06
		Summer	.06	.05	.05	.04	.04	.05	.04	.04

Roof Deck	Ceiling Finish	Season	Insulation on Roof Deck A	B	C	D	E	F	G	H
Gypsum fiber concrete roof deck 3½" thick	7	Winter	.17	.14	.11	.10	.08	.11	.09	.08
		Summer	.08	.07	.06	.06	.05	.06	.06	.05
	8	Winter	.17	.14	.11	.10	.08	.11	.09	.08
		Summer	.09	.08	.07	.06	.06	.07	.06	.05
GYPSUM / GYPSUM B'D	9	Winter	.13	.11	.08	.08	.07	.09	.08	.07
		Summer	.06	.06	.05	.05	.04	.05	.05	.04
	10	Winter	.13	.11	.08	.08	.07	.09	.08	.07
		Summer	.07	.06	.06	.05	.05	.06	.05	.05
GYPSUM / GYPSUM B'D	11	Winter	.10	.09	.08	.07	.06	.07	.07	.06
		Summer	.05	.05	.04	.04	.04	.04	.04	.04
	12	Winter	.10	.09	.08	.07	.06	.07	.07	.06
		Summer	.05	.05	.05	.04	.04	.04	.04	.04

U Factors for Pitched Roofs

Legend:

Insulation or Ceiling on Underside of Joists

- **A** Roof only, underside of joists open
- **B** Metal lath and plaster
- **C** ⅜" gypsum board
- **D** Wood or gypsum lath and plaster
- **E** ⅜" plywood
- **F** ½" rigid insulation board
- **G** ½" rigid insulation board, plastered
- **H** 1" rigid insulation board
- **I** 1" rigid insulation board, plastered
- **J** 1" flexible insulation
- **K** 2" flexible insulation
- **L** 2" flexible insulation, and gypsum board, lath and plaster
- **M** 3½" flexible insulation
- **N** 3½" flexible insulation, and gypsum board, lath and plaster
- **O** 1 sheet reflective aluminum, 1 air space
- **P** Aluminum foil back-up on lath, and plaster
- **Q** 2 sheets reflective aluminum, 2 air spaces
- **R** 1 sheet reflective aluminum plus aluminum foil back-up on lath and plaster, 2 air spaces
- **S** 3 sheets reflective aluminum, 3 air spaces
- **T** 2 sheets reflective aluminum plus aluminum foil back-up on lath and plaster, 3 air spaces

Type of Roofing	Season	Insulation or Ceiling on Underside of Joists A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Slate or tile on wood sheathing	Winter	.56	.34	.34	.32	.31	.23	.23	.17	.17	.17	.10	.09	.06	.06	.22	.23	.14	.15	.10	.11
	Summer	.52	.34	.33	.32	.31	.23	.23	.17	.17	.17	.10	.10	.06	.06	.15	.18	.10	.11	.07	.07
Asphalt shingles or roll roofing on wood sheathing	Winter	.53	.33	.33	.31	.30	.23	.22	.17	.16	.16	.10	.09	.06	.06	.21	.23	.14	.15	.10	.11
	Summer	.49	.33	.32	.31	.30	.23	.22	.17	.17	.17	.10	.10	.06	.06	.15	.18	.10	.11	.07	.07
Wood shingles on wood strips	Winter	.49	.31	.31	.30	.29	.22	.21	.17	.16	.16	.09	.09	.06	.06	.21	.22	.14	.14	.10	.11
	Summer	.46	.31	.31	.29	.29	.22	.21	.17	.16	.16	.10	.09	.06	.06	.15	.17	.09	.10	.07	.07

1. Burma. National Housing and Town and Country Development Board. Housing and social survey. Rangoon?, The Board, 1954. 32p., folded map, tables.

Population: 600,000

Climate: (Rangoon) 107°F.-55°F.

Rainfall: 99"

It appears to be an extremely careful, detailed, survey of existing housing. It was made between Dec. 1951 and Sept. 1952. The survey was house-to-house survey of 302 acres in central Rangoon where the average density was 168 persons per acre.

The purpose of the survey is indicated in the Introduction as follows: "As the physical planning in Rangoon of the housing projects of various types progressed more and more, it became increasingly evident that there were very little data on hand about the families or households who were expected to occupy the new dwellings. Among the mang questions arising from planning problems, the important one as to the amount that families could afford to pay for rent remained unanswered. Other questions concerned the determination of a fair rent policy, the extent subsidies must be used if at all, as to what extent overcrowding is a factor in every-day city life, to what extent should households be moved from congested areas to make way for dense urban housing developments, and the advisiability of establishing some fringe area developments."

2. Newcombe, Vernon Z. A new central housing agency in the Federation of Malaya. (In News sheet of the International Federation for Housing and Town Planning, Aug. 1955, no. 37, p. 29-32; with photo., plan, table.)

Climate: (Singapore) 97°F-66°F

Rainfall: " 95"

Public housing here first given consideration soon after last war. In 1950 a Housing Trust established with power to acquire, build, let or sell, and to borrow money, to make loans, to initiate housing and redistribution schemes.

The Federation of Malay is 500 miles long; 200 miles wide, has area of about 53,000 square miles (a little larger than England without Wales). It is in the humid tropics and four fifths of it covered with evergreen rain forest (jungle). Communications east and west difficult because of north-south range of high hills. Population about six million with nearly 50% Malays, nearly 50% Chinese and a strong minority of Indians. Different populations have very different ideas on design, layout, orientation, etc. The Housing Trust tried unsuccessfully to work through the various ready-established state governments. When this approach failed an architect-manager appointed (Jan. 1953) with assistant staff. Financial resources are limited to about £1,150,000 sterling granted by Federal Government. Therefore they built only houses for sale, and use proceeds as a revolving fund. In poorer sections they gave assistance in offering developed lots so that people could erect simple shelters, usually of wood. This practice was not successful and had to be abandoned.

(continued)

Since people had little capital much was done through Building Societies which are financed partly by the British Government (Colonial Development Corporation). By this means they are able to offer a $5000 3-room house for a deposit of $1000 and a carrying charge of $36 monthly for 15 years. This compares with a rental of $50 per month for a one-room house in the larger towns.

The Trustees found it difficult to ascertain the housing wishes of the population. Two pilot schemes of 15 houses each were developed, one at Malacca, and one at Alor Star. Each scheme had two house types carried out in precast concrete post and panel construction on a 40-inch modular grid. The people viewed these coolly and it was impossible to discover why. It seems likely now that it was because they seemed similar to ones built by the Public Works Dept.

Later a series of exhibitions of various house-type models were established with indications of cost and methods of financing for each. This brought forth the wanted reaction. The Trustees discovered what the people wanted.

On a basis of this ten house types developed. The number of rooms excluding kitchens varies from three to six; the floor areas from 495 to 1565 sq. ft.; the cost from $3700 to $12,000, and the selling price including land, development, and administration charges from $5500 to $17,000.

Cost of living is high in Malaya which is probably the most prosperous area in South East Asia. As an indication of this: skilled bricklayer earns $8.50 daily; senior draughtsman $600.00 monthly; 1 cwt. cement (ex. works) $4.65; one loaf of bread $.55.

As of date of article, four schemes have been completed with a total of 260 houses; 700 houses started in six different towns, including Penang at north and Johore Bahru at extreme south of the Federation.

Plan: Bukit Glugor, Penang: a hilly site which made it impossible to observe normal considerations of orientation in respect to sun or prevailing breeze. The scheme includes a small pedestrian shopping centre.

3. New Zealand. Minister of Housing. Housing, 1955: report on housing for the year ended 31 March 1955. Wellington, Government Printer, 1955. 38p., plans, tables, chart.

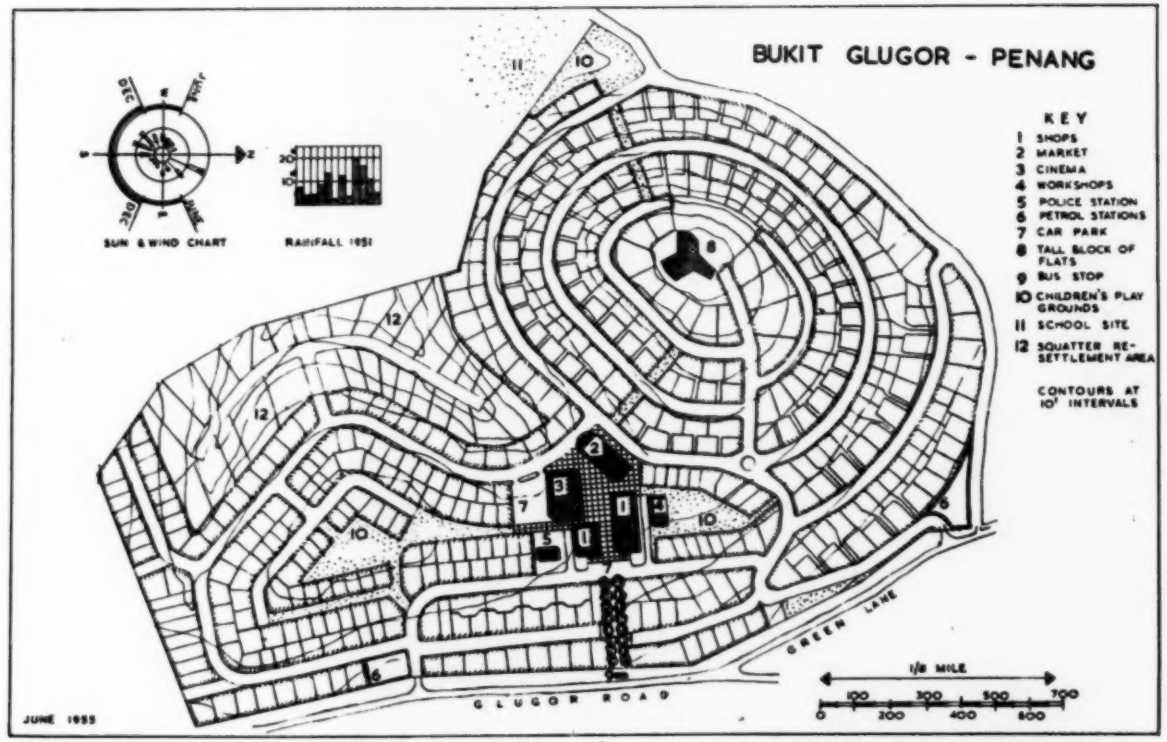
Climate: 94°F-23°F

Rainfall: 49"

An annual report, not limited to a review of State housing activities but a survey of the whole field. The report as a whole is of little interest re tropical housing.

The section of Building Research states that in houses of permanent materials, the Housing Construction Division has investigated, and in most cases actually built, houses of the following types of construction:

(continued)



Plan of Housing Estate Bukit Glugor — Penang.

Concrete bearing walls
Pumice concrete walls
Pre-cast concrete block cavity walls
Brick cavity walls
"No-fines" concrete walls
Concrete cavity walls
Hollow core concrete block walls
Pre-cast concrete panel walls.

Variations have involved the use or otherwise of internal plaster and strapping and lining.

"The importance of thermal conductivity in these forms of construction is important in order to reduce condensation and dampness and to make for warmer buildings. The thermal conductivity of normal concrete is high, of cavity concrete and brick somewhat less, and of pumice and other light-weight concretes still less. As a result of experience with a large number of concrete houses throughout New Zealand the State Advanced Corporation requires strapping and lining in houses with exterior 'bearing' walls of concrete of various kinds, such as concrete slabs and concrete blocks, whether the walls are of solid construction or erected with a cavity."

Recognizing importance of continual research into building and construction methods, arrangements are being made to make available to the New Zealand Institute of Architects the experience of the Housing Construction Division and the State Advanced Corporation.

4. Puerto Rico. Planning Board. Workable program for urban renewal. Santurce, P.R., The Board, 1955. 2 vols.
Section I. [General], dated Jan. 1955, 68 pages.
Section II. City of Cayey, dated Mar. 2, 1955, 19 pages.

Climate: 94° - 62°F
Rainfall: 61"

Section I: Pamphlet concerned with the usual background considerations of a "Workable Program," and how Puerto Rico meets the requirements for it. There is included a section entitled, "Housing for Displaced Families," and under that heading discusses public housing, public subdivisions, experimental approaches to low-cost houses, and other housing resources.

Rehousing of displaced persons depends more on public resources in Puerto Rico than elsewhere in U.S. In U.S. about one half of all families eligible for federal low-rent housing, whereas in P.R. four fifths are eligible. Of these four fifths, 10% cannot afford minimal rental, and Commonwealth Government will make up difference. It is hoped about one third of slum problems will be solved in current year except in San Juan, Ponce, and Mayaguez.

(continued)

In addition to public housing they plan to move salvagable houses from the slums to new lots (new subdivisions). These new subdivisions will serve also for new housing.

A 1947 law also permits P.R. Housing Authority to sell or lease building lots to persons of moderate income and profits obtained be applied to slum clearance housing and for low-income persons.

Recently Governor signed law creating a Research Housing Board to initiate and carry out studies, research, and experiments in relation to the economic, social, and technical aspects of housing, giving preferential attention to low-cost housing problem. Board has appropriation for current year of $30,000.

At present three approaches to providing low-cost housing: 1) Private development under FHA, Section 203. This is now being tried in San Juan metropolitan area where four subdivisions with about 5100 lots has been approved. Houses will sell at from $5000 to $6000 including lot.

2) PRHA (Puerto Rico Housing Authority) "Core" House. At San Jose Development in Rio Piedras, three model houses with two bedrooms and possibility of expansion have been constructed. Estimated cost in production is $2500 to $3000 including lot. They are to be sold on long-term leases with monthly charges of about $15 including tax exemption. They could be rented at a little less. Costs could be reduced by building as duplexes, or in rows. Chief difficulty here is financing.

3) Self-help house. Since 1949, in connection with program for rural communities, experiments have been made working with groups of from 12 to 15 families who build their houses through cooperative effort. The families make concrete blocks for walls, and use concrete floors and roof slabs. Administration supplies land, technical assistance and a loan of not more than $300 for materials. Experiments successful in rural areas. Design now used is 18' x 18' house with two bedrooms and possibility of enlargement. Each house has latrine supplied by the Dept. of Health.

Program now being tried in urban area of San Juan where group of families constructing own houses on fully improved lots of about 252 square meters provided by the PRHA. These concrete block and reinforced concrete houses have 600 sq. ft. floor area, and include living-dining room, kitchen, bathroom, three bedrooms and porch. When houses complete each family can buy its house by obtaining loan of $1500 from Savings and Loan Institution which has agreed to hold mortgage. This $1500 repays PRHA for lot ($800) and materials ($700). Estimated value of house is about $3550. With 20-year loans monthly payments are about $8 to $10.

4) Under appropriation of $300,000, the Social Program Administration will provide about 2000 lots in well planned subdivisions. The lots will be provided with minimum of facilities, and will be sold or rented to eligible families. They will contribute money or work towards supplying further facilities.

Section II: City of Cayey. This pamphlet applies housing measures described above to the redevelopment of Cayey.

5. United Nations Korean Reconstruction Agency. Housing and Construction Section. Expanded housing program for South Korea. [Seoul, Korea], 24 March 1955. 11 typewritten pages.

Population: Seoul - 1,141,766

Climate: Seoul - 100°F-10°F

Rainfall: " 47"

In preamble report is described as a "brief preliminary report regarding an expanded Korean Housing Program to provide everyone in South Korea with adequate shelter." The report covers the following:
a) Number of houses needed
b) Past and current housing efforts
c) Proposed program.

a) Taking into consideration that the 250,000 persons reported destitute include refugees who eventually will return to original homesteads or will find shelter in institutions or established family groups, it may be assumed that present need for housing of refugees is approximately 200,000 housing units. The actual housing shortage as of the date of the report is approximately 856,000 housing units. Approximately 100,000 is judged to be required building activity of country at peace. To cope with present shortages within a period of 10 years, 85,000 units will have to be built per year. To do so will need outside help.

Analysis of types required shows 1/3 of city type, and 2/3 of farm or rural houses. City housing requires considerable financing and organization while rural housing requires only limited financial and administrative encouragement. Assuming that refugees do not necessarily fall within these two categories but rather consist of 50% city dwellers, the following are estimated numbers involved:

City houses--complete	- 318,000
Rural houses--complete	- 538,000
City houses to be repaired	- 150,000
Rural houses to be repaired	- 290,000

b) 14,908 units of temporary shelter were built at beginning of war in crowded areas. These may last up to 10 years. Program of semi-permanent housing started in 1953, now nearly complete. This was undertaken by KCAC's housing.

Up to date of report UNKRA has allotted $5,000,000 for permanent housing. Program designed chiefly as experimental project to

(continued)

provide nucleus of permanent houses throughout Korea of a type of construction utilizing locally available materials to fullest extent and producing permanent, fire-resistant buildings. Another aspect is establishment of organizations to construct and finance the building of increasing number of units for sale on a mortgage basis. Such organizations now exist in Seoul and Pusan, while provincial housing is under control of local authorities responsible to the Ministry of Health and Welfare. It is expected about 8,000 units will be built under UNKRA.

In addition to KCAC and UNKRA, AKF has allocated $150,000 for building of experimental types and has trained four Korean technicians in U.S.A. to assist. AKF expects to build up to 100 city type houses at approximate dollar costs of 50,000 and spend remainder in multi-storied apartments.

Further assisting, FOA has in its 1954 program the importation of construction materials for open sale valued at approximately $4,000,000.

c) There then follow two pages describing basis of following figures for a proposed 10-year program.

	No. of Housing Units	Imported Materials	Conversion Rate* Hwan Cost
City housing	718,000	$385,000,000	325,000,000,000
Rural housing	1,338,000	200,000,000	200,000,000,000
Total	2,056,000	$585,000,000	525,000,000,000
If a 5-year program is adopted the figures would be:			
City housing	518,000	$280,000,000	225,000,000,000
Rural Housing	938,000	140,000,000	150,000,000,000
Total	1,456,000	$420,000,000	375,000,000,000

*These figures are correctly copied from the UN memorandum

In contemplating program there must be consideration of available inland transportation for materials and availability of skilled and unskilled labor. A number of ROK Army troops probably will have to be released to provide sufficient manpower.

Report suggests need of further study of types of housing units practicable and desirable; a study of methods of construction and of use of different materials. It suggests the need of services of a Korean firm of architects and engineers at cost of approximately H [sic] 2,000,000 to produce drawings required. There follows an appendix listing the probably drawings required.

Also in Appendix is a table of "Housing Construction and Destruction" 1940-1953. There is also a table "Number of Refugees in Korea, Feb. 1955."

6. Waterhouse, Edward J. [Letter to editor re housing for military installations at Okinawa.] (In Landscape architecture, July 1955, vol. 45:4, p. 218-219; with photos.)

Population:

Climate:

Rainfall: 82"

Basic requirements are for permanence, total typhoon resistance, functional design, maximum ventilation, light, and economy. Houses are either 3-bedroom, 2-bedroom, 2-bedroom duplex, or 4-man BOQ types. Density ranges from 4 to 7 family units per acre. Average lot width is 65 feet, with depths of from 100 to 140 feet.

The most important item determining siting is not the view of the China Sea (which many have) but a frontage towards the prevailing wind.

Houses are of slab foundations, reinforced, concrete walls, steel sash and louvers, and precast reinforced-concrete-slab roof. Each house has screened porches which serve as drying yards in rainy weather.

Each house has several trees and complete turf coverage usually by means of sprigging with stolons of native grass. Small rock or turf ditches take care of excess surface water which is always present in area where annual rainfall is 82".

All utilities are underground.

Okinawa is 67 miles long and from 2 to 12 miles wide. Its latitude is about that of Miami, Fla., and its typhoons are of the hurricane type.

Photo: General view houses and site herewith.

7. West Bengal. Development Dept. Housing. (In its West Bengal five year plan--a summary. Alipore, West Bengal, Government Press, 1955, p. 54.)

Population: Calcutta 2,548,677

Climate: 111°F-44°F

Rainfall: 62"

Rehousing of bustee-dwellers and constitution of a Housing Board for the purpose. Scheme begun in 1948-49 with plan to acquire land to settle bustee-dwellers in better surroundings. Later modified and revised and housing estate of five blocks containing 72 flats built as Entally, Calcutta, to provide accommodations to middle-class families. Scheme was completed in 1951-52. Buildings have 62 two-room and 10 three-room flats and 12 shop rooms. Land acquired was 327 kattahs at cost of 14.24 lakhs of which 253 Kattahs sold in 46 plots to public, at 14.97 lakhs. Remainder (74 kattahs) used for buildings completed at 11.21 lakhs. Annual rent for these is Rs 74,000, as against maintenance cost of Rs 22,000. Total estimated cost of scheme is 24.62 lakhs, its five-year cost being 1.49 lakhs.

(continued)

Sukiran Housing
Area, Okinawa

Official O.K.E.D. Photo

Tollygunge Land Development Scheme. In 1949 government acquired 104 bigahes of land. Under plan land will be leased for 99 years to public who wish to build own housing. Terms of lease not yet fixed. The area is being developed with roads, parks, surface drainage, water supply, and electricity. All this completed up to 1953-54 except last two mentioned utilities. Total estimated cost of this is 21.12 lakhs, and a five-year cost of 8.80 lakhs, 25.73 lakhs have been spent up to 1953-54.

Kanchrapara Area Development Scheme (Kalyani Township). Scheme started in 1950, with total area of approximately 10,000 acres 35 miles north of Calcutta. Area divided into six blocks. A greenbelt has been reserved on periphery of this area. One of the blocks, Block B, comprising 1100 acreas, has been developed. Up to March 1954 roadways, underground mains, and sewers have been laid and are functioning. Electricity too has been installed. 20 six-storeyed and six double-storeyed model houses have been built. Construction of 500 cheaper ones are to be taken up soon. Houses are for sale to public.

A large market has been constructed. A high school with large grounds has been provided. Police station, post office, and telephone and telegraph facilities are to be provided soon. About 1000 plots of land have been sold up to March 1954 to people willing to build own houses.

Total cost of scheme is estimated to be 11.34 crores. Estimated net expenditure during Plan period is 2.13 crores. Net expenditure up to 1953-54 is 1.95 crores.

8. Wuyts, L. L'urbanization de la cite indigene de Leopoldville. (In L'Habitation, Juin-Juillet 1955, vol. 8:5, p. 468-472; with photos.

Population: 208,662

Climate: 97° - 34°F

Rainfall: 45"

Population in 1940, 46,800; in Dec. 1954 numbered 301,548; at this rate would number half million in 1960. Government has prepared plans for adaptation of ancient city and also for new quarter where great number of natives will be housed.

Article describes division of city into sections and services planned. Density planned at 150 persons per hectare; 5 persons per house.

Dry brick and vegetable tile are the two building materials for type of house to replace the native huts. Article includes photo. of this type, in row-house, pitched roof form. There is also a photograph of detached or semi-detached houses.